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11 43. (Amended) An isolated nucleic acid molecule that hybridizes to a nucleic acid molecule encoded by SEQ ID NO: 31 under the following conditions: 7% SDS, 0.5 M sodium-phosphate buffer at pH 7.2, 1 nM EDTA, pH 8.0 and 55° C, wherein the nucleic acid molecule encodes an amino acid sequence which causes the firing of an olfactory neuron when stimulated.

12 44. (Amended) An isolated nucleic acid molecule that hybridizes to a nucleic acid molecule encoded by SEQ ID NO: 31 under the following conditions: 7% SDS, 0.5 M sodium-phosphate buffer at pH 7.2, 1 nM EDTA, pH 8.0 and 65° C, wherein the nucleic acid molecule encodes an amino acid sequence which causes the firing of an olfactory neuron when stimulated.

### REMARKS

The Advisory Action dated September 5, 2002 has been carefully reviewed and the following remarks are made in response thereto. Applicant thanks the Examiner for indicating that claim 36 is allowable. In view of these remarks, Applicants respectfully request reconsideration and reexamination and the timely allowance of the remaining claims of this application. Applicant would like to thank Examiner Murphy for taking the time to conduct a helpful in person interview with Applicant on November 25, 2002. The above amendments reflect much of the content of what was discussed in the November 25 interview and the several telephonic interviews between Examiner Murphy and Applicant's representative.

### Response to the rejections under 35 U.S.C. 112 first paragraph

Claims 27-35 and 43-44 stand rejected under 35 U.S.C. 112 first paragraph because one of skill in the art would purportedly not know how to use the claimed invention.

The Examiner contends that the specification does not provide the nexus between the nucleic acid of SEQ ID NO: 31 and odorant receptor activity and that it is unclear what function is encompassed by the term "odorant receptor activity". As such, the Examiner contends that one of ordinary skill in the art would not appreciate why the instant invention is useful.

As explained in detail in the specification and in the responses of December 31, 2001 and July 11, 2002, Applicants have clearly established the odorant receptor function for the claimed

sequence and that odorant receptors have patentable utility *inter alia* for the identification of agents which modulate odorant receptor activity, as antigens to raise antibodies against the receptors, and in methods to modify insect behavior as set forth in the specification (see, e.g., summary of utility on page 15, lines 25-28).

The specification clearly establishes the biological function of the odorant receptor family disclosed in the instant application (see, e.g., pages 1-3) and that nucleic acid SEQ ID NO: 31 is a member of this family (see, e.g., page 58 line 16 through page 59, line 9). The Examiner's contention that sequence to function methods of assigning protein function are inaccurate is misplaced. On page 5 of the specification the Applicant clearly indicates that the gene family of the instant invention was identified using computer programs that identify diagnostic features of protein structure. The family of odorant receptor genes identified by the Applicant is large and clustered as are other different previously identified odorant receptor families. The genes identified as odorant receptors are expressed in one or both of the olfactory organs. Furthermore, the disclosure on pp. 58-59 provides that the protein encoded by SEQ ID NO 31 is expressed in the exact location where one would expect an odorant receptor to be. Furthermore, claims 27-35 and 43-45 have been amended to more clearly indicate what is meant by the term "odorant receptor activity". These claims now indicate that the receptors of the instant invention cause the firing of olfactory neurons when stimulated as explained on pages 1-3 and 59 of the specification and on page 8 and figure 4 of the previously filed Carlson Declaration. Thus, upon reading claims 27-35 and 43-45 in light of the disclosure on pages 1-3 and 59 of the specification, one of ordinary skill in the art would recognize how to use the claimed invention.

In light of the aforementioned remarks, Applicants respectfully request that the rejection be withdrawn as it applies to the pending claims.

Claims 27-35 and 43-45 also stand rejected under 35 U.S.C. 112, first paragraph, because the specification purportedly is not enabling for a nucleic acid encoding a fragment of a *Drosophila* odorant receptor protein.

The Examiner contends that the claims of the instant applicant not contain a functional limitation because it is unclear as to what the term "odorant receptor activity" encompasses and as such the specification fails to provide the guidance that one of ordinary skill in the art would need in order to make or use the claimed invention.

As stated previously, the specification provides multiple representative examples of nucleic acids encoding an odorant receptor protein fragment (see page 17, line 28 through page 18, line 17). In addition, one skilled in the art can use well-established protocols to test whether a claimed fragment has odorant receptor activity. Furthermore, claims 27-35 and 43-45 have been amended to more clearly indicate that “odorant receptor activity”, as previously referred to in the claims, is the firing of olfactory neurons when the receptor is stimulated as explained on pages 1-3 and 59 of the specification and on page 8 and figure 4 of the previously filed Carlson Declaration. As such, one skilled in the art at the time of filing would be able to make and use the invention of the instant claims.

Claims 43-44 stand rejected under 35 U.S.C. 112, first paragraph for purportedly containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors had possession of the claimed invention. The Examiner contends that the specification and claims do not indicate what distinguishing attributes are shared by the members of the claimed genus because the term “odorant receptor activity” is unclear.

The specification provides full support for the family of odorant receptors identified by the Applicant. One of skill in the art would immediately recognize that the Applicants had possession of the family of *Drosophila* odorant receptors at the time of filing. Furthermore, claims 43-44 have been amended to more clearly indicate that the odorant receptor activity previously referred to in the claims is the firing of olfactory neurons when the receptor is stimulated. Given the amendments to the claims and the disclosure of the specification, one of skill in the art would clearly know that the Applicant was in possession of a family of odorant receptor genes and that claims 43-44 encompasses a subset of this family.

**Response to the rejection under 35 U.S.C. 102(a)**

Claims 27-35 and 43-44 were rejected under 35 U.S.C. 102(a) purportedly for being anticipated by Celniker *et al.* (1998) (GenBank Accession No. AC004121). The Examiner contends that this reference discloses a nucleic acid sequence that would hybridize to the sequences of the instant invention under conditions to produce a clear signal and thus, given the purported indefinite nature of claim 27, anticipates claims 27-35 and 43-44.

Applicants respectfully submit that the cited art does not disclose all of the limitations of the pending claims because it does not disclose SEQ ID NO: 31, nor an open reading frame, nor a fragment of at least 25 consecutive amino acids encoded by SEQ ID NO: 31, nor host cells comprising the nucleic acid sequence of the instant invention, nor nucleic acid sequences encoding amino acid sequences which when stimulated result in the firing of olfactory neurons. Therefore, Celniker *et al.* does not anticipate claims 27-35 or 43-44. Applicants respectfully request that the rejection be withdrawn.

### **Conclusion**

The foregoing amendments and remarks are being made to place the application in condition for allowance. Applicants respectfully request reconsideration and the timely allowance of the pending claims. A favorable action is awaited. Should the Examiner find that an interview would be helpful to further prosecution of this application, he is invited to telephone the undersigned at his convenience.

If there are any additional fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-0310. If a fee is required for an extension of time under 37 C.F.R. 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

**MORGAN, LEWIS & BOCKIUS LLP**

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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS**

Claim 27 has been amended as follows:

27. (Amended) An isolated nucleic acid molecule that encodes the amino acid sequence of a *Drosophila* Odorant Receptor protein or fragment thereof, wherein the nucleic acid molecule comprises:

(i) nucleotides of SEQ ID NO: 31 which encode the amino acids which comprise the third extracellular domain;

(ii) nucleotides of SEQ ID NO: 31 which encode the amino acids which comprise the fourth extracellular domain; and

(iii) nucleotides of SEQ ID NO: 31 which encode the amino acids which comprise the fourth intracellular domain;

wherein the nucleic acid molecule encodes a protein or fragment thereof which [has odorant receptor activity] **causes the firing of an olfactory neuron when stimulated.**

Claim 43 has been amended as follows:

43. (Amended) An isolated nucleic acid molecule that hybridizes to a nucleic acid molecule encoded by SEQ ID NO: 31 under the following conditions: 7% SDS, 0.5 M sodium-phosphate buffer at pH 7.2, 1 nM EDTA, pH 8.0 and 55° C, wherein the nucleic acid molecule encodes an amino acid sequence [having odorant receptor activity] **which causes the firing of an olfactory neuron when stimulated.**

Claim 44 has been amended as follows:

44. (Amended) An isolated nucleic acid molecule that hybridizes to a nucleic acid molecule encoded by SEQ ID NO: 31 under the following conditions: 7% SDS, 0.5 M sodium-phosphate buffer at pH 7.2, 1 nM EDTA, pH 8.0 and 65° C, wherein the nucleic acid molecule encodes an amino acid sequence [having odorant receptor activity] **which causes the firing of an olfactory neuron when stimulated.**